

## Schulingkamp, Joseph

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**From:** Schulingkamp, Joseph  
**Sent:** Wednesday, January 07, 2015 5:18 PM  
**To:** 'Edward Wiener'  
**Subject:** PES RACT memo and PA  
**Attachments:** 01501 - PES - memo\_12.17.14+js.docx; 01501 - PES - PA\_12.17.14+js.docx; EPA comments on PES RACT Update report and Notes to AMS - 1.7.15.docx  
  
**Categories:** Red Category

Hi Ed,

Here are my comments/suggestions for PES. I know I told Tom on the call yesterday that we wouldn't be able to provide comments on PES since we didn't get enough time to review/check PES's changes to their report, but I figured I could at least give you the comments I have on the memo and PA. We also told Tom that AMS is free to submit the PES report initially and then if things are identified during the review AMS and PES could supplement the submittal.

So here's the BIG caveat to my comments... I was not able to fully review PES's report to check and see whether all the different units/heaters had the correct limits, heat inputs, or other characteristics. Because of this, I skipped all the intricacies in the cost effectiveness calculations in PES's report.

So attached are my redline comments to the memo and PA; these are minor enough that AMS should be able to clear them up before submitting to PADEP. In addition I attached a word doc that lists some overall comments/questions pertaining to both the PES report and, when clarified by PES should be addressed in the memo; this set of comments could be resolved after the initial submittal to PADEP and then included if/when a supplemental submittal is required.

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**CITY OF PHILADELPHIA**  
**Department of Public Health**  
**Public Health Services**  
**Air Management Services**

**InterOffice Memo**

**To:** File  
**From:** Edward Wiener, Chief of Source Registration  
**Date:** December 6, 2014  
**Subject:** 1997 8-Hour RACT Analysis for Philadelphia Energy Solutions Refining and Marketing LLC (PES)

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**I. Introduction:**

The Clean Air Act (CAA) requires that moderate (or worse) ozone nonattainment areas implement reasonably available control technology (RACT) controls on all major sources of Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx). Philadelphia County is part of the Philadelphia-Wilmington-Atlantic City moderate ozone nonattainment area for the 1997 8-hour ozone NAAQS. This document presents the findings of a RACT evaluation for the 1997 8-hour ozone standard for this facility.

**II. Company Information:**

Philadelphia Energy Solutions Refining and Marketing LLC (PES) owns and operates a petroleum refinery at 3144 Passyunk Avenue, Philadelphia, PA 19145. The refinery was previously owned by Sunoco, Inc. (R&M). PES – Tank Farm is part of the main refinery, although it has a different AMS Plant ID and Title V operating permit, however it is included in this RACT determination.

**III. Applicability for NOx and VOC RACT:**

PES is a major source of NOx having potential NOx emissions greater than 100 tons per year, the major source threshold in Philadelphia County that is applicable to NOx RACT for the 1997 8-hour ozone NAAQS.

PES is a major source of VOC having potential VOC emissions greater than 50 tons per year, the major source threshold in Philadelphia County that is applicable to VOC RACT for the 1997 8-hour ozone NAAQS.

**IV. 1-hour RACT:**

PES is subject to the 1-hour RACT determination (PA Permit Numbers 51-1501 and 51-1517) dated August 1, 2000, and approved into the SIP by EPA on October 31, 2001, 66 FR 54942 under the facility's former name Sunoco Inc. (R&M) – Philadelphia. This RACT determination includes both PES Refinery (Plant ID 01501, PA Permit Number 51-1501) and PES – Tank Farm (Plant ID 01517, PA Permit Number 51-1517).

## V. Process Descriptions:

PES' emission sources include 27 refinery fuel gas-fired process heaters, 3 refinery fuel gas-fired boilers, 2 Fluid Catalytic Cracking Units (FCCUs), 5 diesel-fired non-emergency reciprocating internal combustion engines (RICE), 11 emergency generators and fire pumps, storage tanks, cooling towers, 2 loading operations, oil-water separators, and degreasers. More details about these processes can be found below.

**Table 1 - NO<sub>x</sub> Sources**

Location	Source	Permitted Capacity (MMBTU/hr unless noted)	Potential NO <sub>x</sub> Emissions (TPY)
Point Breeze	Unit 210-13H1	235.4	107.2
Point Breeze	Unit 860-2H2	69.8	107.0
Point Breeze	Unit 860-2H3	174.7	124.7
Point Breeze	Unit 860-2H4	99.4	117.6
Point Breeze	Unit 860-2H5	155	110.7
Point Breeze	Unit 860-2H7	59	40.6
Point Breeze	Unit 860-2H8	49.6	24.5
Point Breeze	Unit 864-PH1	80	58.5
Point Breeze	Unit 864-PH11	74	47.0
Point Breeze	Unit 864-PH12	85.1	44.4
Point Breeze	Unit 870-H01	97	14.9
Point Breeze	Unit 870-H02	53	8.1
Point Breeze	Unit 859-1H1	98	8.6
Girard Point	Unit 137 F-1	415	418.1
Girard Point	Unit 137 F-2	155	174.5
Girard Point	Unit 137 F-3	60	15.8
Girard Point	Unit 1332 H-1	45	22.3
Girard Point	Unit 1332 H-2	60	10.5
Girard Point	Unit 1332 H-3	43	21.3
Girard Point	Unit 1332 H-400	186	48.9
Girard Point	Unit 1332 H-401	233	61.2
Girard Point	Unit 1332 H-601	48	23.8
Girard Point	Unit 1332 H-602	49	24.3
Girard Point	Unit 433 H-1	260	39.9
Girard Point	Unit 1232 B-104	70	54.3
Point Breeze	Unit 868 FCCU	50,000 BPD feed rate <sup>1</sup>	130.2
Girard Point	Unit 1232 FCCU	100,000 BPD feed rate <sup>1</sup>	208.3
Girard Point	#3 Boilerhouse Boiler #37	495	86.7

Location	Source	Permitted Capacity (MMBTU/hr unless noted)	Potential NO <sub>x</sub> Emissions (TPY)
Girard Point	#3 Boilerhouse Boiler #39	495	86.7
Girard Point	#3 Boilerhouse Boiler #40	660	115.6
<u>Point Breeze/Girard Point</u>	<u>(11) Diesel Fired Emergency Generators and Fire Pumps (RICE)</u>	<u>Varies</u>	<u>N/A – Limited to 500 hrs/yr</u>
Point Breeze/Girard Point	Engine IC-002	1.4	1.4
Point Breeze/Girard Point	Engine IC-005	0.2	1.0
Point Breeze/Girard Point	Engine IC-006	0.8	1.0
Point Breeze/Girard Point	Engine IC-007	0.7	0.7
Point Breeze/Girard Point	Engine IC-008	1.5	0.3

BPD = barrels per day

<sup>1</sup>The listed permitted capacity for the FCCUs is the maximum permitted throughput in a single day. Each FCCU also has a lower BPD permit limit on a rolling 365-day average.

**Table 2 – VOC Sources**

Location	Source Name	Potential VOC Emissions (TPY)
Point Breeze/Girard Point	Combustion Units <u>(the same heaters and boilers listed in Table 4/All sources listed in Table 1 except the 2 FCCUs)</u>	122.6
Point Breeze/Girard Point	Cooling Towers:	5.45
	210 Crude - 29,600 gpm	3.62
	868 - 19,700 gpm	6.44
	Complex - 35,000 gpm	3.31
	864 - 18,000 gpm	6.68
	137 - 36,300 gpm	6.49
	433 - 35,300 gpm	13.8
	490 - 75,000 gpm	10.49
	1232 - 57,000 gpm	56.3 total
Point Breeze	Unit 868 FCCU	23
Girard Point	Unit 1232 FCCU	8.2
Point Breeze/Girard Point	Engines <u>(same as listed in Table 4/5 Engines and 11 Emergency Generators and Fire Pumps)</u>	Each 1.8 or less

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<u>Point Breeze/Girard Point/Schuylkill River Tank Farm</u>	<u>Equipment Leaks</u>	
<u>Point Breeze/Girard Point/Schuylkill River Tank Farm</u>	<u>Wastewater Treatment Plant Oil/Water separators (Carbon canisters)</u>	
<u>Point Breeze/Girard Point/Schuylkill River Tank Farm</u>	<u>Storage Tanks</u>	
<u>Point Breeze</u>	<u>Stormwater Tank 7308, 7300</u>	
<u>Girard Point</u>	<u>Degreasers</u>	
<u>Point Breeze/Girard Point</u>	<u>Loading Operations (Wharf)</u>	
<u>Girard Point/ Schuylkill River Tank Farm</u>	<u>Loading Operations (Truck Rack)</u>	
<u>Point Breeze/Girard Point</u>	<u>11 Diesel-Fired Emergency and Fire Pump RICE</u>	
<u>Point Breeze/Girard Point</u>	<u>5 Diesel-Fired RICE (&lt;300 HP) <sup>2</sup></u>	

**Commented [JS1]:** We'd like to start by listing all VOC sources, not just case-by-case.

### **De Minimis Sources**

Engines IC-002, IC-005, IC-006, IC-007, and IC-008 each have potential emissions below 2 tons per year for both NOx and VOC. These potential emissions were calculated based on the rated capacity and either AP-42 emission factors or Tier 1 or Tier 2 standards, if applicable. Each engine is considered a de minimis emission source.

**Commented [JS2]:** I'm confused, in PES's RACT update these sources are analyzed as case-by-case, is AMS ignoring PES's proposal? Also, these engines are all <500 BHP, why didn't PES say they were presumptive?

### **Sources Evaluated for RACT Separately**

On August 31, 2012 PES submitted Plan Approval Application No. 12195 to replace the existing RACT limits for the following seven (7) process heaters:

- Unit 231 B101 Heater (rated capacity 104.5 MMBTU/hr)
- Unit 865 11H1 Heater (rated capacity 87.3 MMBTU/hr)
- Unit 865 11H2 Heater (rated capacity 64.2 MMBTU/hr)
- Unit 210 H101 Heater (rated capacity 192.0 MMBTU/hr)
- Unit 210 H201A/B Heater (rated capacity 254.0 MMBTU/hr)
- Unit 866 12H1 Heater from (rated capacity 61.2 MMBTU/hr)
- Unit 868 8H101 Heater from (rated capacity 60.0 MMBTU/hr)

As part of the application, PES revised RACT requirements and re-evaluated RACT for each of these 7 heaters. AMS has submitted ~~separately to EPA for approval~~ a RACT determination for these 7 heaters to EPA for approval separately. As a result, these heaters are not part of this RACT evaluation.

## **VI. RACT Evaluation**

On September 11, 2014, PES submitted to AMS the “PES RACT Update September 2014 – Revision B,” which includes a full case-by-case RACT analysis for the remaining NOx emission sources listed as “Case-by-case” ~~above in Table 3 below~~. AMS has reviewed and concurs with PES’s analysis, which is attached to this document and submitted to EPA as part of the SIP revision.

#### A. NOx RACT

Table 3 below lists the 1-hour RACT requirements for the existing NOx sources. The permitted capacity includes any 1-hour RACT limits. ~~Some permitted capacities and fuel types have changed since 1-hour RACT and will not match the current information found elsewhere in this document. Since the 1-hr RACT plan approval was issued in August 2000, permitted capacities and fuel types have changed. Therefore current emission limits, fuel types, and capacities may not match the EPA-approved 1-hr RACT plan approval. Moving forward, these various changes are being incorporated (or modified where appropriate) for RACT for the 1997 8-hr ozone standard.~~

**Table 3- List of NOx Sources and Applicable 1-hour RACT Requirements**

Location	Source	Permitted Capacity (MMBTU/hr unless noted)	Fuel	1-hour RACT		
				NOx RACT Category	RACT Requirement	Emission Limit
Point Breeze	Unit 210-13H1	235.4	Refinery oil and refinery gas	Case-by-case	Combustion tuning	0.104 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H2	69.8	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.350 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H3	174.7	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.163 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H4	99.4	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.270 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H5	155	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.163 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H7	59	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.157 lb NOx/MMBTU for gas and 0.4 lb NOx/MMBTU for oil
Point Breeze	Unit 860-2H8	49.6	Refinery oil and refinery gas	Presumptive	25 Pa Code §129.93(b)(2)-(5)	Annual Tune-up

Location	Source	Permitted Capacity (MMBTU/hr unless noted)	Fuel	1-hour RACT		
				NO <sub>x</sub> RACT Category	RACT Requirement	Emission Limit
Point Breeze	Unit 864-PH1	80	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.167 lb NO <sub>x</sub> /MMBTU for gas and 0.4 lb NO <sub>x</sub> /MMBTU for oil
Point Breeze	Unit 864-PH11	74	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.145 lb NO <sub>x</sub> /MMBTU for gas and 0.4 lb NO <sub>x</sub> /MMBTU for oil
Point Breeze	Unit 864-PH12	85.1	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.119 lb NO <sub>x</sub> /MMBTU for gas and 0.4 lb NO <sub>x</sub> /MMBTU for oil
Point Breeze	Unit 870-H01	97	Refinery gas	N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze	Unit 870-H02	53	Refinery gas	N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze	Unit 859-1H1	9876	Refinery gas	Case-by-case N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>
Girard Point	Unit 137 F-1	415 <sup>1</sup>	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.230 lb NO <sub>x</sub> /MMBTU on a rolling 30-day average for gas and oil.
Girard Point	Unit 137 F-2	155 <sup>1</sup>	Refinery oil and refinery gas	Case-by-case	Combustion Tuning	0.257 lb NO <sub>x</sub> /MMBTU for gas and 0.4 lb NO <sub>x</sub> /MMBTU for oil
Girard Point	Unit 137 F-3	60	Refinery oil	Case-by-case	Combustion Tuning	0.4 lb NO <sub>x</sub> /MMBTU
Girard Point	Unit 1332 H-1	45	Refinery gas	Presumptive	25 Pa Code §129.93(b)(2)-(5)	Annual Tune-up
Girard Point	Unit 1332 H-2	60	Refinery gas	Case-by-case	Combustion Tuning	0.300 lb NO <sub>x</sub> /MMBTU
Girard Point	Unit 1332 H-3	43	Refinery gas	Presumptive	25 Pa Code §129.93(b)(2)-(5)	Annual Tune-up
Girard Point	Unit 1332 H-400	186 <sup>1</sup>	Refinery gas	Case-by-case	Combustion Tuning	0.156 lb NO <sub>x</sub> /MMBTU
Girard Point	Unit 1332 H-401	233	Refinery gas	Case-by-case	Combustion Tuning	0.156 lb NO <sub>x</sub> /MMBTU
Girard Point	Unit 1332 H-601	48	Refinery gas	Presumptive	25 Pa Code §129.93(b)(2)-(5)	Annual Tune-up
Girard Point	Unit 1332 H-602	49	Refinery gas	Presumptive	25 Pa Code §129.93(b)(2)-(5)	Annual Tune-up
Girard Point	Unit 433 H-1	243 <sup>1</sup>	Refinery gas	Case-by-case	ULNB and Combustion Tuning	0.060 lb NO <sub>x</sub> /MMBTU
Girard Point	Unit 1232 B-104	70 <sup>1</sup>	Refinery gas	Case-by-case	ULNB and Combustion Tuning	0.177 lb NO <sub>x</sub> /MMBTU
Point Breeze	Unit 868 FCCU	50,000 BPD feed rate	Refinery gas	Case-by-case	Good Combustion and CO Promoter	569 tons NO <sub>x</sub> per year on a 365-day rolling avg.

**Commented [JS3]:** I don't know what these are right now but the 76 MMBtu unit was case-by-case.

Location	Source	Permitted Capacity (MMBTU/hr unless noted)	Fuel	1-hour RACT		
				NO <sub>x</sub> RACT Category	RACT Requirement	Emission Limit
Girard Point	Unit 1232 FCCU	100,000 BPD feed rate	Refinery gas	Case-by-case	-	-
Girard Point	#3 Boilerhouse Boiler #37	495 <sup>1</sup>	Refinery oil and refinery gas	Case-by-case	ULNB	0.330 lb NO <sub>x</sub> /MMBTU for both fuels
Girard Point	#3 Boilerhouse Boiler #39	495 <sup>1</sup>	Refinery oil and refinery gas	Case-by-case	ULNB	0.330 lb NO <sub>x</sub> /MMBTU for both fuels
Girard Point	#3 Boilerhouse Boiler #40	660 <sup>1</sup>	Refinery oil and refinery gas	Case-by-case	ULNB	0.330 lb NO <sub>x</sub> /MMBTU for both fuels
Point Breeze/Girard Point	Engine IC-002	1.4	Diesel	<del>Case-by-case</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze/Girard Point	Engine IC-005	0.2	Diesel	<del>Case-by-case</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze/Girard Point	Engine IC-006	0.8	Diesel	<del>Case-by-case</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze/Girard Point	Engine IC-007	0.7	Diesel	<del>Case-by-case</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze/Girard Point	Engine IC-008	1.5	Diesel	<del>Case-by-case</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>
Point Breeze/Girard Point	11 Emergency Generators and Fire Pumps	856 HP or less	3 Diesel 8 ULSD	<del>Presumptive</del> N/A	N/A <sup>2</sup>	N/A <sup>2</sup>

**Commented [JS4]:** These RICE and 11 emergency generators weren't included in the 1-hr RACT.

<sup>1</sup> Indicates a "capped" heat input, rather than maximum capacity, which were approved as part of the 1-hour RACT.

<sup>2</sup> Units were not part of 1-hour RACT

The RACT plan approval approved in the SIP under the 1-hour ozone standard contains only case-by-case requirements for the emissions units identified as such in Table 4-3 above. Under 1-hour RACT, some boilers and heaters are required to have ULNB as RACT. Combustion units without NO<sub>x</sub> controls and not subject to presumptive requirements were required to have annual combustion tuning (CT). Some boilers and heaters have heat input caps in MMBTU/hr (as identified with the footnote "1" in Table 4-3). To determine compliance with these caps, the facility is required to monitor fuel input for these boilers in a daily basis. In addition, all combustion units above 50 MMBTU/hr have lbs NO<sub>x</sub>/MMBTU limits, ~~mostly for both gas and oil burning in some cases one numerical limit is applied to both gas burning and oil burning~~. While most units at the time of the 1-hour RACT evaluation could burn both refinery fuel gas and refinery fuel oil, regular oil use by boilers and heaters was phased out of the facility by the end of 2010 as a requirement in a May 24, 2005 Consent Decree between EPA, several states, the City of Philadelphia, and Sunoco, Inc. (Civil Action No.05-02866). While the Consent Decree allows PES to burn oil in certain circumstances,



such as gas curtailments, PES has completely stopped burning oil in these heaters and boilers and is requesting removal of the ability to burn oil ~~in~~ for its 8-hour RACT. AMS is removing any limitation for burning fuel oil in these boilers and heaters as part of the RACT SIP for PES.

Additionally, the following units were subject to case-by-case requirements under the 1-hour RACT determination, but have since been shut down:

- #3 Boiler House Boiler #38
- 22 Boiler House Boilers #1
- 22 Boiler House Boilers #2
- 22 Boiler House Boilers #3
- 859 Heater 1H1 (76 MMBTU/hr) – This is a different unit from the 98 MMBTU/hr 859 Heater 1H1 listed below as being installed after the 1-hr RACT.
- 859 Heater 1H2
- 859 Heater 1H3
- 864 Heater PH3
- 864 Heater PH4
- 864 Heater PH5
- 861 Heater 3H1S
- 861 Heater 3H1N
- 860 Boiler 2H9

Thus, AMS is not evaluating RACT for these units. ~~Further, AMS and~~ is requesting that the applicable RACT requirements be removed from the SIP.

The following units were subject to presumptive RACT and have since been shut down:

- 860 Heater 2H1
- 860 Heater 2H6
- 864 Heater PH2
- 1332 Heater H-600

These are being listed for informational purposes. No changes to the SIP are required.

The following units were installed after the 1-hour RACT approval:

- PB Unit 870 Heater H01 (97 MMBTU/hr, refinery gas)
- PB Unit 870 Heater H02 (53 MMBTU/hr, refinery gas)
- PB Unit 859 Heater 1H1 (98 MMBTU/hr, refinery gas) – This unit was installed in 2009 as part of the Unit 859 reactivation project and is a different unit from the 76 MMBTU/hr 859 Heater 1H1 listed above.

No internal combustion engines were evaluated in the 1-hour RACT determination. The facility has the following internal combustion engines:

- Eleven (11) emergency generators or emergency fire pumps. The largest unit is 896 HP. Three (3) units burn diesel, eight (8) burn ultra low sulfur diesel (ULSD).
- Five (5) non-emergency units used with pumps or compressors. The largest unit is 214 HP. Each unit burns diesel. ~~Each unit and was~~ permitted after the 1-hour RACT approval.

The following incinerators and flares are control devices that emit NOx when burning/controlling VOCs:

- Unit 867 Sulfur Recovery Unit (SRU) Flare
- North Flare
- South Flare
- Acid Gas Flare
- SWS Flare
- LPG Flare (Propane Loading Station)
- Marine Vapor Recovery Unit (40 MMBTU/hr)
- 1231/1232 Flare
- 433 Flare
- 1232 FCCU CO Boiler (580 MMBTU/hr)

**i. Presumptive RACT for NOx:**

Each heater listed as Presumptive ~~above in Table 3~~ is subject to the presumptive RACT requirements of 25 PA Code Sections 129.93(b)(2)-(5). An annual adjustment or tune-up shall be performed on each unit.

Each of the eleven emergency generators or fire pumps ~~is~~ are subject to the presumptive RACT requirements of 25 PA Code Section 129.93(c)(5). Each unit must be installed, maintained, and operated in accordance with manufacturer's specifications.

The following control devices are ~~applicable-subject~~ to the presumptive RACT requirements of 25 PA Code Section 129.93(c)(4): Unit 867 SRU Incinerator, North Flare, South Flare, Acid Gas Flare, SWS Flare, LPG Flare, Marine Vapor Recovery Unit, 1231/1232 Flare, 433 Flare, and 1232 FCCU CO Boiler. Each unit must be installed, maintained, and operated in accordance with manufacturer's specifications.

**ii. Case-by-case RACT Analysis for NOx:**

## **Boilers and Heaters**

PES has 27 heaters and three (3) boilers. As mentioned above, seven (7) of the heaters were evaluated for RACT separately and are not being addressed in this document. The potential NOx emissions listed in Table 1 for the heaters and boilers are based on the rated capacity and the permitted lbs/MMBTU NOx emission limit for each unit.

For these case-by-case heaters and boilers, the following control options are available, including estimated NOx reduction, and were evaluated:

- Ultra Low NOx Burners (ULNBs) and Selective Catalytic Reduction (SCR) – 96%
- SCR – 85%
- ULNBs – 50-91% (Assumes modern ULNBs control emissions to 0.03 lbs/MMBTU. The NOx emission reduction varies, depending on the unit's current NOx emission rate.)
- Low NOx Burners (LNBs) and Selective Non-Catalytic Reduction (SNCR) – 70%
- LNBs and Flue Gas Recirculation (FGR) – 55%
- SNCR – 40%

### **Control Device Descriptions:**

- ULNBs and LNBs are burners designed to create a larger, lower temperature flame, which reduces thermal NOx.
- SCR injects a nitrogen based reagent such as ammonia into the exhaust upstream of a catalyst. NOx, ammonia (NH3), and oxygen (O2) react on the surface of the catalyst to form nitrogen (N2) and water (H2O).
- SNCR is similar to SCR, but does not use a catalyst.

A summary of the available controls evaluated as RACT for the heaters and boilers and their technical and economic feasibility are provided in Table 4 below. Baseline potential NOx emissions were used for all cost analyses provided. Some units had controls installed after 1-hour RACT, as identified in the Existing Control column in Table 4 below. Emissions from existing controls were considered as baseline for the RACT evaluation.

**Table 4 - Summary of NOx Controls Evaluated as RACT – Boilers and Heaters**

Source	Existing Control	Technical Feasibility and Cost Effectiveness (\$/Ton)					
		ULNB & SCR	SCR	ULNB	LNB & SCR	LNB & FGR	SNCR
Unit 210-13H1	CT	Infeasible	Infeasible	8,178	6,597	Infeasible	7,969
Unit 860-2H2	CT	Infeasible	Infeasible	Infeasible	Infeasible	Infeasible	4,038
Unit 860-2H3	CT	Infeasible	Infeasible	Infeasible	Infeasible	Infeasible	5,831
Unit 860-2H4	CT	Infeasible	Infeasible	4,483	15,584	Infeasible	4,499
Unit 860-2H5	CT	Infeasible	Infeasible	Infeasible	Infeasible	Infeasible	6,099

Unit 860-2H7	CT	Infeasible	Infeasible	Infeasible	Infeasible	Infeasible	9,126
Unit 864-PH1	CT	Infeasible	Infeasible	4,417	10,071	Infeasible	7,657
Unit 864-PH11	CT	Infeasible	Infeasible	5,262	10,588	Infeasible	9,029
Unit 864-PH12	CT	Infeasible	Infeasible	6,800	9,212	Infeasible	10,349
Unit 870-H01	ULNB <sup>1</sup>	ULNB installed	83,367	ULNB installed	ULNB installed	ULNB installed	32,583
Unit 870-H02	ULNB <sup>1</sup>	ULNB installed	105,351	ULNB installed	ULNB installed	ULNB installed	41,395
Unit 859-1H1	ULNB <sup>1</sup>	ULNB installed	145,188	ULNB installed	ULNB installed	ULNB installed	56,517
Unit 137 F-1	CT	18,603	7,438	13,270	15,476	18,464	3,104
Unit 137 F-2	CT	33,208	9,630	26,833	35,765	43,873	4,001
Unit 137 F-3	ULNB <sup>1</sup>	ULNB installed	58,635	ULNB installed	ULNB installed	ULNB installed	23,140
Unit 1332 H-2	ULNB <sup>1</sup>	ULNB installed	87,867	ULNB installed	ULNB installed	ULNB installed	34,528
Unit 1332 H-400	SCR <sup>1</sup>	SCR installed	SCR installed	20,172	SCR installed	SCR installed	SCR installed
Unit 1332 H-401	SCR <sup>1</sup>	SCR installed	SCR installed	20,172	SCR installed	SCR installed	SCR installed
Unit 433 H-1	ULNB	ULNB installed	57,170	ULNB installed	ULNB installed	ULNB installed	22,082
Unit 1232 B-104	ULNB	ULNB installed	18,837	ULNB installed	ULNB installed	ULNB installed	7,622
#3 Boilerhouse Boiler #37	ULNB + FGR <sup>1</sup>	ULNB & FGR installed	37,133	ULNB & FGR installed	ULNB & FGR installed	ULNB & FGR installed	15,052
#3 Boilerhouse Boiler #39	ULNB + FGR <sup>1</sup>	ULNB & FGR installed	37,133	ULNB & FGR installed	ULNB & FGR installed	ULNB & FGR installed	15,052
#3 Boilerhouse Boiler #40	ULNB + FGR <sup>1</sup>	ULNB & FGR installed	34,060	ULNB & FGR installed	ULNB & FGR installed	ULNB & FGR installed	13,456

<sup>1</sup> Controls were installed after the 1-hour RACT determination, thus are not approved as RACT

For each boiler and heater, all additional NOx controls are either technically infeasible or economically unreasonable.

**Table 5 – 1-hour and 8-hour Case-by-Case RACT Requirements for Boilers and Heaters**

Source	Permitted Capacity (MMBtu/hr unless noted)	Approved 1-hour RACT		8-hour RACT	
		RACT Control	Emission Limit	RACT Control	Emission Limit
Unit 210C-Heater 13H1	235.4	Combustion tuning	0.104 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion tuning	0.104 lb NOx/ MMBTU for gas

Source	Permitted Capacity (MMBtu/hr unless noted)	Approved 1-hour RACT		8-hour RACT	
		RACT Control	Emission Limit	RACT Control	Emission Limit
Reformer 860- Heater 2H2	69.8	Combustion Tuning	0.350 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.350 lb NOx/ MMBTU for gas
Reformer 860- Heater 2H3	174.7	Combustion Tuning	0.163 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.163 lb NOx/ MMBTU for gas
Reformer 860- Heater 2H4	99.4	Combustion Tuning	0.270 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.270 lb NOx/ MMBTU for gas
Reformer 860- Heater 2H5	155	Combustion Tuning	0.163 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.163 lb NOx/ MMBTU for gas
Reformer 860- Heater 2H7	59	Combustion Tuning	0.157 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.157 lb NOx/ MMBTU for gas
Reformer 864- Heater PH1	80	Combustion Tuning	0.167 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.167 lb NOx/ MMBTU for gas
Reformer 864- Heater PH11	74	Combustion Tuning	0.145 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.145 lb NOx/ MMBTU for gas
Reformer 864- Heater PH12	85.1	Combustion Tuning	0.119 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.119 lb NOx/ MMBTU for gas
Unit 870- Heater H01	97	N/A	N/A	ULNB <sup>1</sup>	0.035 lb NOx/MMBTU
Unit 870- Heater H02	53	N/A	N/A	ULNB <sup>1</sup>	0.035 lb NOx/MMBTU
Unit 859- Heater 1H1	98	N/A	N/A	ULNB <sup>1</sup>	0.035 lb NOx/MMBTU
Unit 137 Heater F-1	415	Combustion Tuning	0.230 lb/ MMBTU on a 30-day rolling average	Combustion Tuning	0.230 lb/ MMBTU on a 30-day rolling average
Unit 137 Heater F-2	155	Combustion Tuning	0.257 lb NOx/ MMBTU for gas and 0.4 lb NOx/ MMBTU for oil	Combustion Tuning	0.257 lb NOx/ MMBTU for gas
Unit 137 Heater F-3	60	Combustion Tuning	0.4 lb NOx/ MMBTU for oil	ULNB <sup>1</sup>	0.060 lb NOx/MMBTU for gas
Unit 1332 Heater H-2	60	Combustion Tuning	0.300 lb NOx/ MMBTU for gas	ULNB <sup>1</sup>	0.040 lbs/MMBTU
Unit 1332 Heater H-400	186	Combustion Tuning	0.156 lb NOx/ MMBTU for gas	SCR <sup>1</sup>	0.06 lb/MMBTU on a rolling 365-day basis
Unit 1332 Heater H-401	233	Combustion Tuning	0.156 lb NOx/ MMBTU for gas	SCR <sup>1</sup>	0.06 lb/MMBTU on a rolling 365-day basis
Unit 433 - Heater H-1	243	ULNB and Combustion Tuning	0.060 lb NOx/ MMBTU for gas	ULNB and Combustion Tuning	0.060 lb NOx/ MMBTU for gas
Unit 1232 - Heater B-104	70	ULNB and Combustion Tuning	0.177 lb NOx/ MMBTU for gas	ULNB and Combustion Tuning	0.177 lb NOx/ MMBTU for gas

Source	Permitted Capacity (MMBtu/hr unless noted)	Approved 1-hour RACT		8-hour RACT	
		RACT Control	Emission Limit	RACT Control	Emission Limit
#3 Boiler House Boiler #37	495	ULNB and Combustion Tuning	0.330 lbs NOx/MMBTU on a 30-day rolling average	ULNB + FGR <sup>1</sup>	0.040 lb/MMBTU on a rolling 365-day basis
#3 Boiler House Boiler #39	495	ULNB and Combustion Tuning	0.330 lbs NOx/MMBTU on a 30-day rolling average	ULNB + FGR <sup>1</sup>	0.040 lb/MMBTU on a rolling 365-day basis
#3 Boiler House Boiler #40	660	ULNB and Combustion Tuning	0.330 lbs NOx/MMBTU on a 30-day rolling average	ULNB + FGR <sup>1</sup>	0.040 lb/MMBTU on a rolling 365-day basis

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<sup>1</sup> Controls were installed after the 1-hour RACT determination, thus are not approved as RACT

### Conclusions and Recommendations

AMS determines that the following updates to the currently ~~approved 1-hr~~ RACT determination ~~shall be NOx RACT for the 1997 8-hr ozone standard for the boilers and heaters above:~~

- Removing the ability to burn oil for all boilers and heaters. Emissions limits for burning oil will be removed.
- ULNB shall be the RACT control for the following heaters: Unit 870-H01, Unit 870-H02, Unit 859-1H1, Unit 137 F-3, and Unit 1332 H-2.
  - Unit 870-H01 and Unit 870 H02, and Unit 859-1H1 Heaters shall be given NOx emission limits of 0.035 lbs/MMBTU (matches limit in AMS Plan Approval 02184 dated May 12, 2004).
  - Unit 859-1H1 Heaters shall be given a NOx emission limit of 0.02 lbs/MMBTU (matches limit in AMS Plan Approval 06050 dated December 4, 2006).
  - Unit 137 F-3 Heater shall be listed as burning refinery fuel gas and shall be given a NOx emission limit of 0.060 lbs/MMBTU (matches limit in AMS Plan Approval 07163 dated February 5, 2008).
  - Unit 1332 H-2 Heater shall be given a NOx emission limit of 0.040 lbs/MMBTU (matches limit in AMS Plan Approval 05124 dated October 4, 2005).
- SCR shall be the RACT control for Unit 1332 H-400 and Unit 1332 H-401 Heaters. The NOx limit for each heater shall be changed from 0.156 lbs/MMBTU to 0.06 lbs/MMBTU on a rolling 365-day basis (matches limit in AMS Plan Approval 09040 dated February 1, 2010) and 0.15 lbs/MMBTU on a daily basis. These units have a NOx Continuous Emission Monitoring System (CEMS) on their combined stack at the SCR outlet. The SCR may be bypassed during times required to replace SCR catalyst or to do maintenance to the SCR/air pre-heater system or to operate the heaters at low firing rate during reformer catalyst regenerations, as per Plan Approval 09040. PES must take a daily NOx sample when the SCR and CEMS are bypassed. The daily and rolling 365-day emission limits still apply

Commented [JS5]: The table above says 0.035

Commented [JS6]: I haven't had time to talk to our permitting folks here, but this seems fairly lax. If the CEMS is not bypassed there would potentially be 3,264 readings/day for the 136 MMBtu/hr heater and 5,592 readings/day for the 233 MMBtu/hr heater (since the NOx limit is in lbs/MMBTu, assuming a lb/MMBTu reading per MMBtu burned for each heater)

I realize that the CEMS wouldn't give a lbs NOx reading for every MMBtu burned but as a way to compare, PES would normally be required to meet the limit with an equivalent reading(s) from the CEMS. So it seems like replacing many thousands of CEMS readings with only one NOx sample per day doesn't seem right.

during the bypasses.

- FGR in addition to existing ULNB shall be the RACT control for #3 Boilerhouse Boilers #37, 39 & 40. The NOx limit for each boiler shall be changed from 0.330 lbs/MMBTU on a rolling 30-day to 0.040 lbs/MMBTU on a rolling 365-day basis (matches limit in AMS Plan Approval 08080 dated 11/2/10). They have been given an additional daily NOx limit of 0.10 lbs/MMBTU. These boilers ~~are already were~~ required to have NOx CEMS ~~in RACT~~ as part of the 1-hr RACT.
- Removal of all conditions referring to the following shutdown units:
  - #3 Boiler House Boiler #38
  - 22 Boiler House Boilers #1
  - 22 Boiler House Boilers #2
  - 22 Boiler House Boilers #3
  - 859 Heater 1H1 (76 MMBTU/hr unit)
  - 859 Heater 1H2
  - 859 Heater 1H3
  - 864 Heater PH3
  - 864 Heater PH4
  - 864 Heater PH5
  - 861 Heater 3H1S
  - 861 Heater 3H1N
  - 860 Boiler 2H9

#### **Fluid Catalytic Cracking Units (FCCU)**

PES has two (2) FCCUs. The 868 FCCU is a full-burn unit that is permitted to operate up to 50,000 barrels in a single day and 47,500 barrels per day on a rolling 365-day average. Under 1-hour RACT the unit has a NOx emission limit of 569 tons per rolling 12-month period and must follow good combustion practices and use a CO promoter in the regenerator. Potential NOx emissions in Table 1 are based on the 47,500 barrels per day on a rolling 365-day average permit limit from AMS Plan Approval No. 00184 dated March 22, 2003 and a 50 ppmvd @ 0% oxygen limit proposed by PES in a February 2013 "868 Low NOx CO Combustion Promoter Study" to comply with the Second Amendment of Civil Action No.05-02866 Consent Decree.

The 1232 FCCU is a partial-burn unit that is permitted to operate up to 100,000 barrels in a single day. It is equipped with a waste heat CO Boiler. It did not have any specific requirements under 1-hour RACT. It had SCR installed after the 1-hour RACT determination. Potential NOx emissions in Table 1 are ~~from a based on the~~ rolling 365-day NOx permit limit from Plan Approval No. 04322 dated February 28, 2006.

The following control devices are available for controlling NOx emissions from FCCUs:

- SCR – Estimated 90% NOx control efficiency for FCCUs.
- LoTOx™ – This technology works in conjunction with a wet scrubber. It is a selective, low

temperature oxidation technology that uses ozone to oxidize NO<sub>x</sub> to water soluble nitric pentoxide (N<sub>2</sub>O<sub>5</sub>), which, inside the wet scrubber, forms nitric acid that is subsequently scrubbed by the scrubber nozzles and neutralized by the scrubber's alkali reagent. Estimated 90% NO<sub>x</sub> control efficiency for FCCUs.

- SNCR – Estimated 40% NO<sub>x</sub> control efficiency for FCCUs.

SCR, SNCR, and LoTOx<sup>TM</sup> were evaluated as technically feasible control options for the 868 FCCU.

**Table 6 - Summary of NO<sub>x</sub> Controls Evaluated as RACT – FCCUs**

Source	Existing Control	Technical Feasibility and Cost Effectiveness (\$/Ton)		
		SCR	SNCR	LoTOx <sup>TM</sup>
868 FCCU	Good Combustion and CO Promoter	33,563	12,159	13,328
1232 FCCU	SCR	SCR Installed	SCR Installed	SCR Installed

SCR, SNCR, and LoTOx<sup>TM</sup> are all economically unreasonable for the 868 FCCU based on cost per ton of NO<sub>x</sub> controlled.

Since no NO<sub>x</sub> control ~~is~~ more effective than SCR for ~~an~~ the FCCUs is available, no further control evaluation was performed on the 1232 FCCU. The SCR ~~will~~ shall be considered NO<sub>x</sub> RACT for the unit under the 1997 8-hour ozone standard.

**Table 7 – 1-hour and 8-hour Case-by-Case RACT Requirements for FCCUs**

Source	Permitted Capacity (MBPD)	Approved 1-hour RACT		8-hour RACT	
		RACT Control	Emission Limit	RACT Control	Emission Limit
868 FCCU	50	Good Combustion and CO Promoter	569 tons per rolling 12-month period	Good Combustion and CO Promoter	100 ppmdv @ 0% O <sub>2</sub> on a 7-day rolling average, and 130.2 tons per rolling 365-day period
1232 FCCU	100	N/A	N/A	SCR	30 ppmdv @ 0% O <sub>2</sub> on a 7-day rolling average and 208.28 tons per rolling 365-day period



The 100 ppmdv @ 0% O<sub>2</sub> on a 7-day rolling average emission limit for the 868 FCCU is a proposed limit by PES in a February 2013 "868 Low NO<sub>x</sub> CO Combustion Promoter Study" to comply with the Second Amendment of Civil Action No.05-02866 Consent Decree. The 30 ppmdv @ 0% O<sub>2</sub> on a 7-day rolling average limit for the 1232 FCCU is from Plan Approval No. 11353 dated July 30, 2012. The tons per rolling 365-day period limit come from the potential emissions in Table 1 for each unit, calculated as described above.

### Conclusions and Recommendations:

AMS determines that adding a 100 ppmdv @ 0% O<sub>2</sub> on a 7-day rolling average NO<sub>x</sub> limit and modifying the annual NO<sub>x</sub> limit to 130.2 tons per rolling 365-day period ~~as shall be NO<sub>x</sub> RACT for the 1997 8-hour RACT~~ for Unit 868 FCCU. AMS determines the existing SCR ~~as 1997 8-hour shall be NO<sub>x</sub> RACT for the 1997 8-hour ozone standard for~~ Unit 1232 FCCU. ~~and adding~~ In addition, a 30 ppmdv @ 0% O<sub>2</sub> on a 7-day rolling average NO<sub>x</sub> emission limit and a 208.28 tons per rolling 365-day period NO<sub>x</sub> emission limit (matches limits in AMS Plan Approval No. 04322 dated February 28, 2006). AMS is also adding a requirement to operate a NO<sub>x</sub> CEMS on the Unit 868 FCCU and the Unit 1232 FCCU.

### B. VOC RACT

The facility's air emissions sources contributing to VOC emissions include the following:

**Table 8 -**

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Location	Source Name	RACT Category	VOC RACT Summary
Point Breeze/Girard Point	Combustion Units <sup>1</sup> <u>&lt;50 MMBtu/hr</u>	<u>Units &lt; 50 MMBTU/hr</u> Presumptive	Exempt - meets PA Code § 129.93
	<u>Combustion Units <sup>1</sup></u> <u>&gt;50 MMBtu/hr</u>	<u>Units &gt;= 50 MMBTU/hr Case-by-case</u>	<u>No RACT option for controlling VOC emissions</u>
Point Breeze/Girard Point	Cooling Towers	Case-by-case	Inspection and maintenance/monitoring program for VOC fugitive emissions
Point Breeze	868 Fluid Catalytic Cracking Unit	Case-by-case	Full-burn unit, no <u>VOC</u> RACT proposed
Girard Point	1232 Fluid Catalytic Cracking Unit	Case-by-case	Partial-burn unit

Point Breeze/Girard Point/Schuylkill River Tank Farm	Equipment Leaks	CTG	<del>Exempt</del> —meets PA Code § 129.58
Point Breeze/Girard Point/ Schuylkill River Tank Farm	Wastewater Treatment Plant Oil/Water separators (Carbon canisters)	CTG	<del>Exempt</del> —meets PA Code § 129.55
Point Breeze/Girard Point/ Schuylkill River Tank Farm	Storage Tanks	CTG	<del>Exempt</del> —meets PA Code §§ 129.56 and 129.57
Point Breeze	Stormwater Tank 7308, 7300	CTG	<del>Exempt</del> —meets PA Code §§ 129.56 and 129.57
Girard Point	Degreasers	CTG	<del>Exempt</del> —meets PA Code § 129.63
<del>Point Breeze/Girard Point</del>	Loading Operations (Wharf)	Case-by-case	
Girard Point/ Schuylkill River Tank Farm	Loading Operations (Truck Rack)	CTG	<del>Exempt</del> —meets AMR V, Section V
Point Breeze/Girard Point	<del>11</del> Diesel-Fired Emergency and Fire Pumps RICE	Presumptive	<del>Exempt</del> —meets PA Code § 129.93
Point Breeze/Girard Point	<del>300.5</del> HP Diesel-Fired RICE (<300 HP) <sup>2</sup>	Case-by-case	Good combustion practices

<sup>1</sup> The combustion units are the same boilers and heaters listed in the NOx RACT section.

<sup>2</sup> The diesel-fired RICE are the same units listed in the NOx RACT section.

**Commented [JS7]:** Yes, these are all “exempt” from case-by-case analysis, but we don’t want to give the impression that they are “exempt” from RACT. So we’ll just say they meet whatever section is listed

**i. CTG RACT [i.e. Applicable to EPA Control Technique Guideline (CTG)]-~~or Presumptive RACT:~~**

The following sources are subject to RACT regulations that ~~are approved in the SIP~~ have been SIP-approved in accordance with EPA’s Control Technique Guidelines (CTGs) for controlling VOC emissions. In addition, each regulation has been recertified by Pennsylvania as meeting the applicable CTG requirements for RACT for the 1997 8-hour ozone standard.

Equipment leaks are ~~applicable-subject~~ to 25 PA Code Section 129.58, which satisfies EPA’s CTG RACT requirements for the control of VOC emissions in leaks from petroleum refinery equipment. In accordance with 25 PA Code Section 129.58, the facility must conduct a monitoring program for equipment leaks. ~~This requirement has been approved in the SIP as part of the RACT plan approval.~~

Wastewater Treatment Plant Oil/Water Separators are ~~applicable-subject to the~~ 25 PA Code Section 129.55, which satisfies EPA’s ~~CTG RACT CTG~~ requirements for the control of VOC emissions for VOC controls of refinery vacuum producing systems, wastewater separators, and process turnarounds. In accordance with 25 PA Code Section 129.55, containers, pumps, and compressors

in the refinery ~~must be sealed~~ handling VOCs with a vapor pressure greater than 1.5 psia shall have mechanical seals.

Storage Tanks and Stormwater Tank 7308 and 7300 are ~~applicable-subject~~ to 25 PA Code §§Sections 129.56 and 129.57, which ~~satisfies~~satisfy EPA's CTG RACT requirements for the control of VOC emissions from petroleum liquid storage. Tanks storing VOCs with a vapor pressure greater than 1.5 psia must have a floating roof or vapor recovery system and control device if the tank is greater than 40,000 gallons and a pressure relief valve meeting certain requirements if they are between 2,000 gallons and 40,000 gallons.

Degreasers are ~~applicable-subject~~ to 25 PA Code Section 129.63, which satisfies EPA's CTG RACT requirements for the control of VOC emissions from solvent metal cleaning. Degreasers must meet certain equipment standards and operating requirements.

Truck Loading Operations are ~~applicable-subject~~ to the CTG RACT requirements of Air Management Regulation V, Section V. Loading organic materials with a RVP of 4.0 or greater requires a vapor recovery system.

~~Emergency diesel fired RICE units are covered by the presumptive RACT requirements of 25 PA Code Section 129.93(c)(5), as mentioned in the NOx RACT section~~

**Commented [JS8]:** Moved to presumptive section.

## ii. Presumptive RACT:

Combustion units (boilers and heaters) with a rated heat input ~~greater than or equal to or greater than~~ 20 MMBTU/hr but less than 50 MMBTU/hr ~~are also rated 20 MMBTU~~ are ~~applicable-subject~~ to 25 PA Code Sections 129.93(b)(2)-(5). An annual adjustment or tuneup shall be performed on each unit.

~~The eleven E~~ emergency generators and fire pumps are ~~applicable-subject~~ to 25 PA Code Sections 129.93(c)(5). Each unit must be installed, maintained, and operated in accordance with manufacturer's specifications.

## iii. Case-by-case RACT Analysis for VOC:

The PES April 2014 RACT Update submittal includes a full case-by-case RACT analysis for the VOC emission sources listed above. AMS accepted this analysis, which is being incorporated by reference.

**Commented [JS9]:** The PES RACT Update shows the 5 non-emergency RICE engines as case-by-case, but AMS has them as de minimis?

## Combustion Units Rated 50 MMBTU/hr and Greater

There ~~were~~are no ~~specific~~ 1-hour VOC RACT requirements for the combustion units (boilers and heaters) with a rated heat input of 50 MMBTU/hr or greater. ~~There are because there were~~ no technically feasible VOC control options for these combustions units. It is not technically feasible to vent combustion unit exhausts to ~~other combustion units~~control devices like flares. Oxidation catalysts have not been demonstrated at refineries and are considered technically infeasible because the sulfur compounds found in refinery fuel gas poisons the catalyst. Most combustion units at the facility have potential VOC emissions below 5 tons per year.

#### **Conclusions and Recommendations:**

AMS ~~Determines~~determines that there are no VOC RACT controls for the combustion units.

#### **Cooling Towers**

The cooling towers emit fugitive VOC emissions when leaks in refinery heat exchangers allow VOCs to enter the cooling water streams and become volatilized when the cooling water passes through the cooling towers. The potential emissions listed in Table 2 were calculated using AP-42 emissions factors (AP-42 Table 5.1-2 for controlled emissions) and the circulation rate of the units. The SIP-approved 1-hour RACT plan approval requires an inspection and maintenance/monitoring program for VOC fugitive emissions from cooling towers. There are no add-on control devices for VOC emissions from cooling towers as all emissions are fugitives. As is noted in AP-42, controlling emissions from cooling towers involves minimizing leaks and monitoring cooling water for hydrocarbons. PES currently does this through the inspection and maintenance/monitoring program for VOC fugitive emissions from cooling towers as required in 1-hour RACT ~~plan approval and an equipment monitoring program for heat exchange systems as required by 40 CFR 63, subpart CC, (National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries.~~

#### **Conclusions and Recommendations:**

AMS determines the existing 1-hour VOC RACT requirements continue to represent ~~1997 8-hour~~ RACT for the cooling towers for the 1997 8-hour ozone standard. In addition, AMS determines that the equipment monitoring program for heat exchange systems required by 40 CFR 63, subpart CC shall be VOC RACT for the 1997 8-hour ozone standard.

#### **Fluid Catalytic Cracking Units (FCCUs)**

The Unit 1232 FCCU at the Girard Point Refinery is a partial-burn unit that uses a carbon monoxide (CO) waste heat boiler to reduce VOC emissions to very low levels (potential VOC emissions are 8.2 tons per year). There are no ~~specific~~ 1-hour VOC RACT requirements for this unit.

The Unit 868 FCCU at the Point Breeze Refinery is in operation as a full-burn unit, where minimal VOC and CO emissions are emitted in the exhaust gas after thermal regeneration of the catalyst. There are no specific 1-hour VOC RACT requirements for this unit. The 868 FCCU is required to have good combustion practices controlling the level of excess oxygen and CO promoter in the regenerator for NOx RACT, which also helps to reduce VOC emissions.

The only VOC control device available for FCCUs is a CO Boiler, which can only be used with partial burn units. CO boilers burn the CO in exhaust gases as fuel, converting it into CO<sub>2</sub>, and producing steam. Full-burn FCCUs do not emit CO in high enough concentrations to make CO boilers technologically feasible.

The Unit 1232 FCCU already has a CO boiler, the only VOC control option. A CO boiler is not technically feasible for the Unit 868 FCCU because it is a full-burn unit.

#### **Conclusions and Recommendations for VOC RACT:**

AMS determines that good combustion practices ~~as 1997 8-hour VOC RACT~~ for Unit 1232 FCCU shall be VOC RACT for the 1997 8-hour ozone standard. AMS determines that good combustion practices controlling the level of excess oxygen and CO promoter in the regenerator ~~as 1997 8-hour RACT~~ for Unit 868 FCCU shall be VOC RACT for the 1997 8-hour ozone standard.

#### **Marine Loading Operations (Wharf)**

The Girard Point Barge Loading Process (P130) is controlled by a thermal oxidizer (CD011, described as a flare in the Title V operating permit). The Point Breeze Marine Barge Loading (P636) ~~has a Marine~~ has a Marine Vapor Collection and Control System which collects and feeds vapors to process heaters and boilers as fuel. ~~Neither process had any requirements in 1-hour RACT. Both processes were subject to the CTG RACT requirements of 25 PA Code Section 129.81 for the 1-hour RACT determination. However, at this time AMS is not recertifying 25 PA Code 129.81 as meeting the RACT requirements for marine vessel loading, and thus these sources are subject to a case-by-case RACT analysis.~~

At the time of the 1-hour RACT analysis, 25 PA Code 129.81 was the presumptive RACT regulation for marine vessel loading in Pennsylvania. As such, these two sources were required to have a thermal oxidation/combustion unit installed with at least 90% VOC capture and destruction efficiency. Since then, EPA has issued new RACT requirements for marine vessel loading found in 40 CFR Part 60, Subpart Y that require a capture and destruction efficiency of at least 98% for thermal oxidation/combustion units.

The following are potential control options for barge loading:

- Thermal Oxidation/Combustion Unit (est. 95%-98% VOC control)
- Carbon Adsorption (85%-95%)
- Bioreactor (60%-99%)
- Scrubber 50%-98%
- Condensation (50%-90%)

Both units already have the most stringent available control options installed, a thermal oxidation/combustion unit, however, —due to the requirements of 40 CFR Part 60, Subpart Y, AMS will add the following RACT requirements in order to further strengthen the capture and destruction efficiency:

Girard Point Barge Loading shall vent to a Thermal Oxidizer with a VOC destruction efficiency of at least 98% or control to an outlet of 20 ppmv VOC or less. The Thermal Oxidizer shall have a continuous temperature monitor and recorder.

Point Breeze Marine Barge Loading shall be operated with a Marine Vapor Collection and Control System (MVCACS). Vapors from the operation of the MVCACS shall be fed as a primary fuel to the process heaters and boilers in order to achieve a minimum of 98% VOC destruction efficiency or control to an outlet of 20 ppmv VOC or less.

~~A-The~~ 20 ppmv VOC outlet concentration option has been added for each loading process in the event there are times where the inlet concentration is very low, making it very difficult to achieve a high destruction efficiency. This option has been included as a compliance option in some Federal regulations.

#### **Conclusions and Recommendations for VOC RACT:**

AMS determines that a Thermal Oxidizer with a 98% VOC control efficiency or controls outlet emissions to 20 ppmv VOC ~~as 1997 8-hour shall be VOC RACT for the 1997 8-hour ozone standard~~ for Girard Point Barge Loading. AMS determines that a MVCACS which vents vapors to process heaters and boilers along with a 98% VOC control efficiency or controls outlet emissions to 20 ppmv VOC ~~as 1997 8-hour shall be VOC RACT for the 1997 8-hour ozone standard for~~ Point Breeze Marine Barge Loading.

#### **Emergency Diesel-Fired RICE Units**

~~Emergency diesel-fired RICE units are covered by the presumptive RACT requirements of 25 PA Code Section 129.93(c)(5), as mentioned in the NOx RACT section~~



**CITY OF PHILADELPHIA  
DEPARTMENT OF PUBLIC HEALTH  
AIR MANAGEMENT SERVICES**

**RACT PLAN APPROVAL -DRAFT**

Effective Date: December 16, 2014

Expiration Date: None

Replaces Permit Nos. PA Permit Numbers 51-1501 and 51-1517 dated August 1, 2000

In accordance with provisions of the Air Pollution Control Act, the Act of January 8, 1960, P.L. 2119, as amended, and after due consideration of a Reasonably Available Control Technology (RACT) proposal received under the Pennsylvania Code, Title 25, Chapter 129.91 thru 129.95, of the rules and regulations of the Pennsylvania Department of Environmental Protection (PADEP), Air Management Services (AMS) approved the RACT proposal of the Facility below for the source(s) listed in section 1.A. Emission Sources of the attached RACT Plan Approval.

Facility: Philadelphia Energy Solutions Refining and Marketing LLC (PES)  
Owner: Philadelphia Energy Solutions Refining and Marketing LLC  
Location: Girard Point Processing Area located at 3001 Penrose Ave  
Point Breeze Processing Area located at 3144 Passyunk Ave  
Mailing Address: 3144 Passyunk Ave., Philadelphia, PA 19145  
SIC Code(s): 2911  
Plant ID: 1501 and 1517  
Facility Contact: Charles Barksdale  
Phone: (215) 339-2074  
Permit Contact: Charles Barksdale  
Phone: (215) 339-2074  
Responsible Official: Nithia Thaver and James Keeler  
Title: General Managers

Edward Wiener, Chief of Source Registration

Date

12/16/14

The RACT plan approval is subject to the following conditions:

1. The purpose of this Plan Approval is to establish Nitrogen Oxides (NOx)/Volatile Organic Compound (VOC) Reasonably Available Control Technology (RACT) for PES Girard Point Processing Area and Point Breeze Processing Area. This includes the following emission sources and control equipment:

A. Emission Sources

- (1) Process Heaters: Unit 137:  
F1 heater (415 MMBTU/hr)  
F2 heater (155 MMBTU/hr)  
F3 heater (60 MMBTU/hr)

~~Process heaters F1 and F2 burn refinery fuel gas. Heater F3~~All three heaters burns refinery fuel gas.

- (2) Process Heater: Unit 231: B-101 heater (104.5 MMBTU/hr) fires refinery fuel gas.
- (3) Process Heater: Unit 433: H-1 heater (243 MMBTU/hr) Heater fires refinery fuel gas.
- (4) Process Heaters: Unit 1332:  
H-400 heater (186 MMBTU/hr)  
H-401 heater (233 MMBTU/hr)

H-2 heater (60 MMBTU/hr)

These heaters burn refinery fuel gas.

- (5) Process Heater: Unit 1232: B-104 heater (70 MMBTU/hr) Heater fires refinery fuel gas.

- (6) Boiler House #3:  
Boiler #37 (495 MMBTU/hr)  
Boiler #39 (495 MMBTU/hr)  
Boiler #40 (660 MMBTU/hr)

These boilers fire refinery fuel gas.

- (7) Crude Unit 210:  
Section A HTR H101 (192.0 MMBTU/hr)  
Section B HTR H201 (254.0 MMBTU/hr)  
Section C HTR 13H1 (235.4 MMBTU/hr)

These heaters above fire refinery fuel gas.

- (8) Hydrocracker Unit 859: HTR 1H1 (98 MMBTU/hr) Unit fires refinery fuel gas.



- (9) Reformer Unit 864: HTR PH11 (74 MMBTU/hr)  
HTR PH12 (85.1 MMBTU/hr)  
These heaters fire refinery fuel gas.
- (10) Distillate HDS Unit 865: HTR 11H1 (87.3 MMBTU/hr after installation of ULNBs)  
HTR 11H2 (64.2 MMBTU/hr)  
These heaters fire refinery fuel gas.
- (11) Gas-Oil HDS Unit 866: HTR 12H1 Heater (61.2 MMBTU/hr) fires refinery fuel gas
- (12) Reformer Unit 860: HTR 2H3 (174.67 MMBTU/hr) Unit fires refinery fuel gas.  
HTR 2H5 (155 MMBTU/hr) Unit fires refinery fuel gas.  
  
HTR 2H2 (69.78 MMBTU/hr) Unit fires refinery fuel gas.  
HTR 2H4 (99.44 MMBTU/hr) Unit fires refinery fuel gas.  
  
HTR 2H7 (59 MMBTU/hr) Unit fires refinery fuel gas.
- (13) 868 FCCU HTR 8H101 Unit fires refinery fuel gas
- (14) 868 FCCU Catalyst Regenerator
- (15) Cooling towers
- (16) Fugitive leaks: valves, flanges, compressors, pumps, pipes.
- (17) Unit 870: HTR H01 (97 MMBTU/hr)  
HTR H02 (53 MMBTU/hr)  
These heaters fire refinery fuel gas.
- (18) Unit 1232 FCCU
- (19) Girard Point Barge Loading (P130)
- (20) Point Breeze Marine Barge Loading (P636)

**B. Control Equipment**

- (1) Ultra-low NOx burner (ULNB) systems are installed on the following sources to control NOx emissions:  
Unit 433 H-1 heater  
Unit 1232 B-104 heater  
#3 Boiler House boilers #37, #39, and #40.  
Unit 210 H201 heater  
Unit 870 H01 and H02 heaters  
Unit 859 1H1 heater  
Unit 137 F-3 heater  
Unit 1332 H-2 heater.

(2) Flue Gas Recirculation (FGR) is also installed on #3 Boiler House boilers #37, #39, and #40.

Commented [JS1]: I numbered 2, 3, and 4 here

(3) Selective Catalytic Reduction (SCR) shall be installed on Unit 1332 H-400 and H-401 heaters. PES shall operate the SCR system while operating the heaters (H-400/401) except during times required to replace SCR catalyst or to do maintenance to the SCR/air pre-heater system or to operate the heaters at low firing rate during reformer catalyst regenerations. PES shall take a daily NOx sample during these maintenance periods when it is necessary to by-pass the SCR/air pre-heater system and the NOx CEM, and the heaters are operated in natural draft mode. During these natural draft operating periods the maximum allowable NOx limitation will be 0.15 lb/MMBTU on a daily average, as defined in Condition 4.B below. All emissions during the natural draft duration shall be counted in the rolling 365-day limit in Condition 4.B.

(4) Thermal Oxidizer shall be maintained on Girard Point Barge Loading (CD-011).

(5) Marine Vapor Collection and Control System (MVCACS) shall be maintained for Point Breeze Barge loading.

2. This approval requires and authorizes:

A. The installation of Ultra Low NOx Burners on 231 B101 heater and 865 11H1 heater to comply with RACT requirements 18-month after the issuance of this plan approval.

B. PES will use combustion tuning to comply with RACT requirements for the following heaters:

Unit 137: F1 heater, F2 heater, F3 heater

Unit 1332: H-400 heater, H-401 heater, H-2 heater

Crude Unit: 210A HTR H101, 210C HTR 13H1

Hydrocracker Unit 859: HTR 1H1, HTR 1H2, HTR 1H3

Reformer Unit 864: HTR PH3, HTR PH5, HTR PH1, HTR PH2, HTR PH4, HTR PH11, HTR PH12

Distillate HDS Unit 865: HTR 11H2

Reformer Unit 860: HTR 2H3, HTR 2H5, HTR 2H4, HTR 2H2, HTR 2H7

Gas Oil HDS Unit 866: HTR 12H1

Unit 868: HTR 8H101

C. All process heaters and boilers are limited to refinery fuel gas and will be capped at the heat input specified in the table below.

Process Unit	Source	Heat Input Cap (MMBTU/hr)
Unit 137:	F1 heater	415
	F2 heater	155
Unit 433:	H-1 heater	243
Unit 1332:	H-400 heater	186
Unit 1232:	B-104 heater	70
Boiler House #3:	Boilers #37, and #39	495
	Boiler #40	660
Reformer Unit 864	HTR PH2	45

D. PES shall monitor all fuel input to all heaters and boilers with BTU limitations on a daily basis to insure capacity limits are not exceeded or PES shall install fuel limiting devices on the heaters or boilers to keep capacities below allowable.

- E. The 868 FCCU NOx emissions shall be limited to 100 ppmv @ 0% O<sub>2</sub> on a 7-day rolling average and 130.2 tons per rolling 365-day period. PES shall follow good combustion practices controlling the level of excess oxygen and CO promoter in the regenerator to minimize NOx emissions from the regenerator. A NOx Continuous Emission Monitoring System (CEMS) shall be operated on the unit.
- F. The 1232 FCCU shall have Selective Catalytic Reduction (SCR). NOx emissions shall not exceed 30 ppmv @ 0% O<sub>2</sub> on a 7-day rolling average and 208.28 tons per rolling 365-day period. The 12432 FCCU shall be operated with good combustion practices. A NOx Continuous Emission Monitoring System (CEMS) shall be operated on the unit.
- G. PES shall utilize an inspection and maintenance/equipment monitoring program in accordance with 40 CFR 63, subpart CC for VOC fugitive emissions from cooling towers.
- H. PES shall utilize a fugitive emissions leak detection and repair program (LDAR) for all valves, pumps, flanges, and compressors in VOC service. Monitoring of components shall be conducted on a quarterly basis (gaseous service) and an annual basis (liquid service) for all sources not covered under an existing LDAR program.
- I. Girard Point Barge Loading shall vent to a Thermal Oxidizer with a VOC destruction efficiency of at least 98% or control to an outlet of 20 ppmv VOC or less. The Thermal Oxidizer shall have a continuous temperature monitor and recorder.
- J. Point Breeze Marine Barge Loading shall be operated with a Marine Vapor Collection and Control System (MVCACS). Vapors from the operation of the MVCACS shall be fed as a primary fuel to the process heaters and boilers in order to achieve a minimum of 98% VOC destruction efficiency or control to an outlet of 20 ppmv VOC or less.

**Commented [JS2]:**

**Commented [JS3]:** I put this in because that's what the facility said they wanted as RACT and I assume it's better than "an inspection and maintenance/monitoring program"

### 3. RACT Implementation Schedule

- A. PES shall immediately begin the implementation of the measures necessary to comply with the approved RACT Plan Approval.
- B. Sources proposing combustion tuning to comply with RACT requirements of 25 PA Code 129.91(f) shall perform the annual combustion tuning by December 31<sup>st</sup> of each year not to exceed 12 months between tunings.
- C. Sources applicable to presumptive RACT requirements of 25 PA Code 129.93(b)(2) shall complete the annual adjustment or tune-up by December 31<sup>st</sup> of each year not to exceed 12 months between tunings.
- D. Sources proposing installing Ultra Low NOx Burners to comply with RACT requirements of 25 PA Code 129.91(f) shall perform combustion tuning annually by December 31<sup>st</sup> of each year not to exceed 12 months between tunings.
- E. The 231 B101 heater shall be limited to 91 MMBTU/hr until the burners are installed. The 865 11H1 heater shall be limited to 72.2 MMBTU/hr until the burners are installed. The 0.03 lbs/MMBTU NOx emission limit listed below for each unit will not become applicable until the burners are installed.

**Commented [JS4]:** I think PAs typically have immediately

### 4. Testing Requirements and Stack Emission Limitations

- A. For units installing ULNB, PES shall conduct performance tests for NOx. The results of these tests have been submitted to AMS.
- B. The final NOx RACT emission limits for the #3 Boiler House boilers, 137 Unit F1 heater, #, and Unit 210 H201 heater, have been established through the use of Department approved Continuous Emission Monitoring System (CEMS). Compliance with the limitations listed below will be on a 30-day rolling average based on hourly averages of CEM data for the Unit 137 F1 heater, on a daily average based on hourly averages of CEM data for limits noted as daily average,

**Commented [JS5]:**

and on a 365-day rolling average based on hourly averages of CEM data for the other units. The limits for the Unit 231 B101 heater and Unit 865 11H1 heater are not applicable until the Ultra Low NOx Burners are installed.

Source	Limitation
Boiler House #3 – boilers #37, #39, and #40	0.040 lbs. NOx/MMBTU
Boiler House #3 – boilers #37, #39, and #40	0.10 lbs. NOx/MMBTU (daily average)
137 Unit F1 heater	0.230 lbs. NOx/MMBTU
Unit 210 H201 heater	0.03 lbs. NOx/MMBTU
Unit 231 B101 heater	0.03 lbs. NOx/MMBTU
Unit 865 11H1 heater	0.03 lbs. NOx/MMBTU
Process Heater Unit 1332 H-400 heater	0.06 lbs. NOx/MMBTU
Process Heater Unit 1332 H-401 heater	0.06 lbs. NOx/MMBTU
Process Heater Unit 1332 H-400 heater	0.15 lbs. NOx/MMBTU (daily average)
Process Heater Unit 1332 H-401 heater	0.15 lbs. NOx/MMBTU (daily average)

- C. Compliance with emission limits for combustion sources listed below shall be determined by quarterly stack sampling with a portable NOx analyzer. After one year sampling, PES may petition AMS for semi-annual monitoring. AMS may, at any time, require three one-hour stack tests.

Source	Limitation (lbs. NOx/MMBTU)
Process Heater Unit 433 H-1 heater	0.060
Crude Unit 210A HTR H101	0.089
Crude Unit 210C HTR 13H1	0.104
F-2 @ 137 Unit	0.257
F-3 @ 137 Unit	0.060
B-101 @ 231 Unit	0.122
H-2 @ 1332 Unit	0.040
B-104 @ 1232 Unit	0.177
1H-1 @ 859 Unit	0.035
PH-1 @ 864 Unit	0.167
PH-11 @ 864 Unit	0.145
PH-12 @ 864 Unit	0.119
11H-1 @ 865 Unit	0.113
2H-3 @ 860 Unit	0.163
2H-5 @ 860 Unit	0.163
2H-2 @ 860 Unit	0.350
2H-4 @ 860 Unit	0.270
2H-7 @ 860 Unit	0.157
Unit 865 11H2 heater	0.113
Unit 866 12H1 heater	0.113
Unit 868 8H101 heater	0.113
H01 @ 870 Unit	0.035
H02 @ 870 Unit	0.035

- D. All annual combustion tuning shall at a minimum meet the requirements set forth in 129.93 (b)(2) through (5).
- E. At least thirty (30) days prior to a performance NOx test, PES shall inform AMS of the date and time of the scheduled test.
- F. PES shall conduct performance tests to determine compliance with the lbs NOx/MMBTU emission limits of this plan approval for the following heaters:

- i. Within 180 days of the installation of ULNBs for the Unit 231 B101 Heater and the Unit 865 11H1 Heater.
  - ii. By June 08, 2016 for the Unit 210 H101 Heater, Unit 865 11H2 Heater, Unit 866 12H1 Heater, and Unit 868 8H101 Heater.
  - iii. Testing shall be conducted in accordance with 25 Pa. Code Chapter 139
- G. The Unit 210 H201 Heater shall be equipped with continuous monitors and recorders for NO<sub>x</sub> and O<sub>2</sub>. The continuous monitors and recorders shall meet the requirements of 25 Pa. Code Chapter 139.
- H. Each heater listed below shall be limited to the following rolling 365-day heat input limits:
  - i. Unit 231 B101 Heater shall not exceed 856,000 MMBTU on a rolling 365-day basis.
  - ii. Unit 865 11H1 Heater shall not exceed 699,000 MMBTU on a rolling 365-day basis.
  - iii. Unit 865 11H2 Heater shall not exceed 500,000 MMBTU on a rolling 365-day basis.
  - iv. Unit 210 H101 Heater shall not exceed 1,643,000 MMBTU on a rolling 365-day basis.
  - v. Unit 210 H201A/B Heater shall not exceed 2,172,000 MMBTU on a rolling 365-day basis.
  - vi. Unit 866 12H1 Heater shall not exceed 456,000 MMBTU on a rolling 365-day basis.
  - vii. Unit 868 8H101 Heater shall not exceed 480,000 MMBTU on a rolling 365-day basis.
- 5. Recordkeeping and Reporting Requirements
  - A. The permittee shall maintain a file containing all the records and other data that are required to be collected to demonstrate compliance with NO<sub>x</sub>/VOC RACT requirements of 25 PA Code 129.91 - 129.94.
  - B. The records shall provide sufficient data and calculations to clearly demonstrate that the requirements of §129.91-129.94 are met.
  - C. Data or information required to determine compliance shall be recorded and maintained in a time frame consistent with the averaging period of the requirement.
  - D. Records shall be retained for at least two years and shall be made available to the Department on request.
- 7. The company shall not impose conditions upon or otherwise restrict the Department's access to the aforementioned source(s) and/or any associated air cleaning device(s) and shall allow the Department to have access at any time to said source(s) and associated air cleaning device(s) with such measuring and recording equipment, including equipment recording visual observations, as the Department deems necessary and proper for performing its duties and for the effective enforcement of the Air Pollution Control Act.
- 8. Revisions to any ~~emission limitation or capacity incorporated in this RACT Approval~~ conditions approved as RACT by EPA will require resubmission as revision to the PA State Implementation Plan. The applicant shall bear the cost of public hearing and notification required for EPA approval as stipulated in 25 PA Code §129.9(h).

## EPA comments on PES RACT Update report and Notes to AMS

### Minor errors in the PES report:

- Page numbering – there seem to be two sets of pages numbered 23-29
- On page 15, table 3-2, 2<sup>nd</sup> row – “Unit 860 – 2H2”
- On page 32 of the pdf, #4 mentions “previously-mentioned ACT Document” is this the process heater ACT? If so, please change to something more specific such as “Process Heater ACT”
- On page 35 of the pdf, table 3-5, footnote #1 – which unit is this for? No unit has this footnote
- Unit 433 H-1 was approved in the 1-hour RACT as 243 MMBtu/hr maximum capacity. In PES’s report this unit is listed as having 260 MMBtu/hr. As this unit was capped at 243 for the 1-hr RACT, it is not allowed to have a firing rate over 243. (AMS has fixed this in their memo)

### Notes for AMS:

- On page 30 of PES’s pdf, footnote #10 indicates that a vendor quote was relied upon. The vendor quote should be included in the SIP submittal.
- The 5 non-emergency RICE generators are analyzed as case-by-case in PES’s report, but AMS’s memo lists them as de minimis. Also, why weren’t these generators presumptive since all five are under 500 bhp?

### Notes for PES and AMS

- For SCR and SNCR cost analyses: The lifetime of the SCR/SNCR should be 20 years not 10 years as described in EPA’s Cost control manual.
- For all cost analyses: 20% interest rate seems extremely high, especially since consumer interest rates are currently so low. PES should explain why they would be subject to such a high rate.
- PES incorrectly assumed a “Lost Production” of \$14,000,000 for several cost analyses. Lost production can only be used as a “buffer” since the revenue lost would be due to unanticipated circumstances. An example of lost production would be if a burner installation was initially assumed to take 10 days and, during installation, the boiler tubes were discovered to be too corroded and had to be replaced requiring an additional 4 days. The lost revenue during the 10 days is not considered “Lost Production” but the 4 additional days would be. So the facility estimates a “buffer” just in case some unforeseen delay occurs.
- Missing units that were in the 1-hr RACT:
  - Point Breeze – NOx
    - Asphalt Heaters H1, H2, H3, and H5
    - Hydrocracker 856 – 1H4
    - Scott Heater Incinerator
    - 3 Yard Flares
    - 2 Emergency Turbines (50 MW each)
  - Girard Point – VOC
    - Blowdown System, PTE = 27 tpy

- All these units were listed as Presumptive RACT, however the facilities should be listing ALL sources at the facility, regardless of what the 1-hr RACT was. The basic rundown should be: List all sources, identify which units were included in the 1-hr but have since shutdown, identify any new sources, identify which units are presumptive or CTG, then identify case-by-case, do case-by-case analysis for each source, then ensure that ALL sources meet 110(l) (anti-backsliding) [typically for presumptive or CTG sources there is no change because the regulation wouldn't be allowed to become less stringent, so in those cases no 110(l) needed].